REMARKS

This amendment responds to the Office Action mailed September 14, 2007. In the office action the Examiner:

- rejected claims 25-30 and 46-48 under 35 U.S.C. 101 as being directed to non-statutory subject matter;

- rejected claims 1, 3-4, 6, 13, 15, 16, 18, 25, 27-28, 30, 38, 40, 42, 44, 46, and 48 under 35 U.S.C. 103(a) as being unpatentable over Matsuda (US 2003/0225779) in view of Burrows (US 2004/0243569);

- rejected claims 5, 17 and 29 under 35 U.S.C. 103(a) as being unpatentable over Matsuda (US 2003/0225779) in view of Burrows (US 2004/0243569) and further in view of Lewak et al. (US 6,826,566);

- rejected claims 37, 39, 41, 43, 45 and 47 under 35 U.S.C. 103(a) as being unpatentable over Matsuda (US 2003/0225779) in view of Burrows (US 2004/0243569) and further in view of Beavin et al. (US 6,571,233); and

- rejected claims 37, 39, 41, 43, 45 and 47 under 35 U.S.C. 103(a) as being unpatentable over Matsuda (US 2003/0225779) in view of Burrows (US 2004/0243569) and further in view of Rajasekaran et al. (US 7,020,782).

After entry of this amendment, the pending claims are: claims 1, 3-6, 13, 15-18, 25, 27-30, and 37-48 (27 claims, 3 of which are independent claims).

Claim Amendments

Independent Claim 25 has been amended to clarify that the "search engine for querying number range searches" is a patentable apparatus comprising "one or more servers, each having one or more processors and memory." These amendments are supported by at least Figure 1 and Figure 11, and the accompanying text in the specification.

Rejection of Claims Under 35 U.S.C. § 101

The Examiner has rejected Claims 25-30 and 46-48 as embodying an abstract idea and thus not being patentable subject matter. The amendments to independent Claim 25 resolve this issue. The Applicant respectfully requests that the Examiner withdraw the rejections to claims 25-30 and 46-48 under 35 U.S.C. 101.

The Examiner has rejected the claims in view of at least *Matsuda* and *Burrows*. The Applicant respectfully contends that these references, when combined, do not teach or suggest the claimed invention. As the Applicant argued in the response to the last office action, neither *Burrows* nor *Matsuda* teach generating:

> an expression of numerical index terms based on the boundary
> number… wherein a respective numerical index term in **the**
> **expression includes information indicative of an integral**
> **portion of <u>a logarithm of the boundary number</u>;**
> (Claims 1, 13 and 25, emphasis added).

The Examiner concedes that "Matsuda does not explicitly teach the claimed limitation 'wherein a respective numerical index term in the expression includes information indicative of an integral portion of a logarithm of the boundary number.'" (office action dated 9/14/07, page 8, paragraph 5). Likewise, *Burrows* does not teach the above claimed limitation.

In particular, *Burrows* does not contain any teaching that suggests calculating "a logarithm of the boundary number." <u>Applicant respectfully requests that the Examiner identify, in *Burrows*, **a boundary number** (i.e., an endpoint of a number range) for which a logarithm has been computed.</u> It is noted that in the example in columns 25 and 26 of *Burrows*, the range 57-70 is encoded as a set of metawords, all of which are listed at the top of column 26. None of the metawords in the expression for the range 57-70 represents or includes a logarithm value.

The *Burrows* expression for the range 57-70 is: 57_1, 58_2, 60_3, 64_3, 68_2, 70_1. The first metaword, 57_1, means a range size of 1 starting at 57. The second metaword, 58_2, means a range size of 2 starting at 58. The third metaword, 60_3, means a range size of 4 starting at 60. And so on. The first part of the metaword gives the starting point of the range, and the second part of the metaword indicates the size of the range. <u>None of the metawords in the *Burrows* expression for the range 57-70 includes a logarithm (of a boundary number, or any other number) and none is based on a logarithm.</u> On this basis alone, it is seen that Burrows does not teach the claim limitation cited above.

<u>The boundary numbers for the range 57-70 are 57 and 70. *Burrows* does not teach calculating a logarithm of these boundary numbers, or any other boundary numbers.</u>

The Examiner cites several paragraphs of *Burrows* (column 25, line 10 through column 26, line 13), which contain only two references to logarithms:

> The number of levels needed to encode a range of N integers,
> with doubling of sizes, is a function of **<u>$\log_2 N$</u>, where N is the**

> **number of possible range-based integer values** to be encoded.

(Burrows, column 25, lines 37-40, emphasis added)

> With **log₂ based encoding** at most 2L-1 metawords need to be searched if L levels are used for the expression of the range-based values.

(Burrows, column 26, lines 6-9, emphasis added)

The "$\log_2$ based encoding" discussed by *Burrows* in column 26 refers to the discussion in column 25, where *Burrows* discusses the "number of levels needed to **encode** a range of N integers." Furthermore, the discussion in column 25 of *Burrows* teaches the calculation of $\log_2 N$ (i.e., the logarithm, base 2 of N), where "N is the number of possible range-based integer values to be encoded." As defined by *Burrows*, N is the size of the range to be encoded, not a boundary number of the range. Thus, *Burrows* is not calculating "a logarithm of the boundary number," and cannot teach the above cited limitation, present in all independent claims. For at least this reason, the claimed invention is not anticipated by *Matsuda* and *Burrows* and the Applicant respectfully requests that the Examiner withdraw the 17 U.S.C. 103(a) rejections to all pending claims.

Furthermore, as described in greater detail the Applicant's response to the office action dated 5/18/07, neither *Burrows* nor *Matsuda* teaches the calculation of a logarithm as an intrinsic part of the search process. *Matsuda* does not discuss calculating logarithms, and *Burrows* discusses calculating logarithms solely for the purpose of **extrinsic** evaluation of the computational characteristics of "Range-Based Metaword" encoding. In contrast, the claimed invention teaches calculating logarithms as an **intrinsic** part of the search process (i.e., calculating the logarithm of a number either to represent a number in a document or to create a search query expression). For at least this reason, the claimed invention is not anticipated by *Matsuda* and *Burrows* and the Applicant respectfully requests that the Examiner withdraw the rejections to all pending claims under 17 U.S.C. 130(a).

In light of the above amendments and remarks, the Applicant respectfully requests that the Examiner reconsider this application with a view towards allowance. The Examiner is invited to call the undersigned attorney at (650) 843-4000, if a telephone call could help resolve any remaining items.

Respectfully submitted,

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